

**53:107 and 52:107 Sustainable Systems
Spring Semester 2010
SYLLABUS**

Instructor: Prof. Jerry Schnoor
Office: 4119 Seamans Center
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Class Meetings: MW 4:30-5:45
Lecture Room: 3505 SC
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Course Website: www.cgrer.uiowa.edu/sustainable_systems/

Date/Period	Topic of Lecture and Class Discussion	Instructor/s
Jan. 20	Overview of Sustainability Definitions, Metrics, Ecological Footprint Introduction of Class Projects	Jerry Schnoor
Jan. 25	Materials Balances and Industrial Ecology Scale: Unit Operation, Process, Plant, Industry, National, Global (metals)	Jerry Schnoor
Jan. 27	Pollution Prevention IDNR P2 Program Internships Univ of Iowa Sustainability programs	Danielle Dilks, Jeffrey Fiagle, Charles Geguzis
Feb. 1	Global Climate Change, Greenhouse Gas (GHG) Emissions and Sources, Carbon Trading	Jerry Schnoor
Feb. 3	Energy Audits UI Energy Policies and Building Performance	Janet Razbadouski, Zuhair Mased, Facilities Management
Feb. 8	Life Cycle Assessments: Introduction (energy, water, materials, wastes); Industrial Ecology by Tom Graedel, Yale University	Jerry Schnoor
Feb. 10	<i>Quiz #1 (Sustainability, Energy, P2, LCA)</i> Environmental Economics, Payback Period, Green Accounting, Chicago Climate Exchange, Using Markets, Triple Bottom Line, DJSGL, SRI	Jerry Schnoor
Feb. 15	Environmental Management Systems, ISO 14,000 and other systems	Michael Valde
Feb. 17	Environmental Compliance Iowa Laws and Regulations, Kyoto and beyond Treaty Obligations	Michael Valde,
Feb. 22	Analysis, Assessment, and Metrics; Summary of Analysis Tools	Jerry Schnoor
Feb. 24	Energy Efficient/Sustainable Buildings: Green Build/Green Design, LEED Certification	Kevin Monson (Neumann &

		Monson,Architects)
March 1	Living in a Changing Water Environment	Jerry Schnoor
March 3	Low Impact Development (Water) Urban hydrology, green roofs, bioswales, bioretention ponds, porous pavements	Jerry Schnoor
March 8	<i>Quiz #2 (Econ, EMS, Compliance, LEED, Water)</i> Lecture on Millennium Development Goals	Jerry Schnoor
March 10	Water Infrastructure, Distributed vs. Central, Resilient Systems, Water Reuse, Aquifer Storage and Recovery	Jerry Schnoor
March 15	SPRING BREAK – NO CLASS	
March 17	SPRING BREAK – NO CLASS	
March 22	Renewable Energy: Wind	Dean Barry Butler, College of Engr.
March 24	Renewable Energy: Wind	Robert Lloyd, Clipper Wind, CR
March 29	Renewable Energy: Conservation, Geothermal heat-pumps, geothermal energy and power	Jerry Schnoor
March 31	Renewable Energy: Biofuels, Renewable Performance Stds., Low Carbon Fuels, Energy Security (liquid transportation fuels)	Jerry Schnoor
April 5	Renewable Energy: Solar PV, CSP, solar thermal	Jerry Schnoor
April 7	Renewable Energy: Plug-in hybrid electric cars, fuel cells	Jerry Schnoor
April 12	<i>Quiz #3 (Renewables and Water Reuse)</i> Clean Coal Technologies, Carbon Capture and Storage; “Geoengineering” our climate	Jerry Schnoor
April 14	Other forms of Alternative Energy: Nuclear power as an alternative, Hydrogen economy	Jerry Schnoor
April 19	Sustainable Agriculture: No-till, wetlands, best management practices, on-farm efficiency Sustainable Food systems, local production, organic vs. production agriculture, local produce, vegetarianism, “food miles”	Jerry Schnoor
April 21	Design for the Developing World	Craig Just
April 26	<i>Quiz #4(Nuclear, Fuel Cells, Sustainable Ag) on Sustainable Communities</i>	Jerry Schnoor
April 28	FINAL PROJECT PRESENTATIONS	Jerry Schnoor
May 3	FINAL PROJECT PRESENTATIONS	Jerry Schnoor
May 5	FINAL PROJECT PRESENTATIONS	Jerry Schnoor

Course Objectives and Grading: The objective of the class is to analyze technological systems for efficient production and use of energy, water, buildings (materials),

agriculture (food), and industry. These systems are analyzed with respect to sustainability metrics including their energy and carbon footprints, greenhouse gases emissions, materials used, and dollars saved. The course is intended for junior/senior undergraduates and graduate students early in their program. Lectures, vigorous class discussions, homework and quizzes, and project presentations comprise the content of the course (approximately 50 minute lectures and 25 minutes of discussion each period). Class attendance and discussion are an important part of the learning experience. There is no book required for the class, but reading and web content will be assigned, and slide presentations will be distributed as supplementary course materials on the course website. A few guest lecturers will be utilized to present the latest developments in their specialty areas. Students will work in small groups of 4-5 people on projects of their choice, designed to utilize sustainability concepts developed in class and to actually make a difference. Project groups will present their work in final presentation. Individual grades will be based on class participation and homework assignments (25%), four quizzes (10% each), and final presentations (15%), and the final written project report (20%). Student projects should have a goal of actually being implemented and, thus, improving the sustainability of our campus or community.

Note: If there is any student who needs special accommodations to participate in the class, please see me at or before the first period, and we will make arrangements accordingly.